been described above. There are, therefore, in the first instance, two distinct sets of minute pulmonary veins. One of these, after leaving the leaflets, makes its way at once in a direction towards the left auricle, without undergoing any further exposure to the air. The other is spread over the mucous membrane, and derives the benefit of the atmospheric influence which the surface of that membrane affords, and ultimately joins the other portion. The anatomical distribution of the pulmonary vessels indisputably proves that their physiological function is exclusively in relation with the air supplied by the bronchial tubes, and that it is totally independent of any purpose having relation to the construction or repair of any part of the *tissue* of the lungs.

(The paper was accompanied by numerous drawings and diagrams.)

Dr. Heale, at the request of the President, drew attention to the apparatus which he employed. He showed that in injecting the pulmonary arteries and veins with different colours both should be injected simultaneously, so that the two fluids should meet in the capillaries. If the arteries by themselves were injected first, the fluid passing through the capillaries into the larger vessels beyond would prevent the proper injection afterwards of the veins, and *vice versâ*. He showed that no anastomosis existed between the so-called bronchial vessels and those of the pulmonary system, as the capillaries of the first could be injected in every part of the lungs without any of the injection reaching any of the other vessels. In speaking of the distribution of the air to the tissue of the lungs, he mentioned that a very free anastomosis was established between the air contained in different parts of the lungs after the bronchial tubes had reached their minutest subdivision. Dr. Heale gives the name of pedicles to the smallest of the bronchial tubes, and that of leaflets to the ultimate subdivisions of the pulmonary tissue. He showed that there was a complex inosculation between different leaflets and pedicles. The equal diffusion of air throughout the lungs is further provided for by tubular passages which ramify in the subpleural and interlobular cellular tissue, and communicate with longitudinal channels in the substance of the pleura. Passing to the physiological points involved in the various anatomical details, he remarked that it was usual to speak of respiration as one thing, of circulation as another, and of nutrition as a third; but that in point of fact all three were parts of one and the same physiological operation, and that it was as impossible that the circulation or the nutrition should go on independently of the respiratory processes as that the hands of a watch should continue to point the hour when the mainspring was impeded in its action. Dr. Heale then explained at some length his views with regard to the heart's action in effecting the circulation of the blood, the physiology of respiration, &c.

In answer to a question from Dr. Lee, Mr. Heale stated that he had been engaged during the last two years in dissecting the ganglia and nerves of the lungs, and that in these dissections a great system of ganglia and nerves was displayed throughout the lungs; and he considered that without taking into account these nervous structures of the lungs the functions of those organs could not be explained.—*Med. Times and Gaz.*, May 30, 1863.

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3. *Fœtus born without Heart, Brain, Lungs, or Liver.*—Dr. Wm. H. DICKINSON read before the Royal Medical and Chirurgical Society (May 12th, 1863) a description of a monster of this kind.

This being, like all others of the same character, was a twin. Both umbilical cords were attached to a single elongated placenta. The imperfect fœtus was devoid of any vestige of head or neck. The upper extremities were present, but were in some respects imperfect. On the anterior surface was a small prominence, which appeared to represent the tip of the tongue. The umbilical cord was surrounded at its fœtal extremity by a small membranous bag, which contained a coil of intestine. The lower extremities were only slightly different from their usual state. The body was generally swollen and œdematous. The spinal column was deficient from the second cervical vertebra upwards. No trace of any cranial bones could be discovered. The clavicles were absent. The integuments were of unusual thickness, owing to a general infiltration of serous fluid. In the cavity of the trunk lay the lower two feet of the intestine, which commenced by a cæcal extremity, and two large kidneys. The ureters, the bladder, the urachus, and a pair of undescended testicles were found in their normal relations. The other viscera were absent. The umbilical cord contained a large vein and artery. The artery divided on entering the belly into two large branches, one of which passed into the right thigh and side of the pelvis. The other division served for all the rest of the body. It swept upwards to the position due to the aorta on the left side of the spine, and gave off vessels for the left thigh, for the left side of the pelvis, and for the kidneys. It terminated between the shoulders by dividing abruptly into two large branches, which went to each upper extremity. The veins were arranged in an almost parallel manner. There was no communication between the two sets of vessels corresponding to the foramen ovale. The entire encephalon and the upper part of the spinal cord were wanting. The sympathetic ganglia were large, but not numerous. A chain of eight lay along the side of the vertebral column. Numerous filaments maintained the connection between the sympathetic ganglia and the spinal nerves.

Since there was no communication between the veins and arteries of the fœtus answering to the foramen ovale, but the veins throughout the body were simply continuous with the umbilical vein, and the arteries with the umbilical artery, it was inferred that either in the cord or in the body of the monstrosity the usual direction of the blood must have been inverted. If it passed, as usual, from the mother down the umbilical vein, then it must have been continued into the tissues by the veins of the fœtus. On the other hand, if the course of the circulation was not thus reversed in the fœtus, the artery of the cord must have brought the supply from the placenta.

This question was discussed, and the author finally adopted a suggestion of the late Dr. Young, which had been worked out by Sir Astley Cooper, that the circulation in such monstrosities is due to the impulse of the heart of the healthy fœtus, which always accompanies them, and which is conveyed through anastomosing vessels between the two cords upon the surface of the common placenta. The blood thus reaches the imperfect fœtus through its umbilical artery, and is thence distributed to its tissues.

Mr. Savory said, cases like the one just related were especially interesting with regard to the forces concerned in the circulation of the blood. He believed it was now generally accepted that the heart was not the sole agent in the movement of the blood. Of the other forces employed, that which was generated at the capillaries was assuredly not the least. But cases like the present one confirmed this doctrine; for in this, as in some others, especially the case recorded by Houston, it seemed almost impossible, after a careful study of their anatomy, to arrive at the conclusion that the heart of the healthy child was sufficient to maintain, not only its own circulation, but that of the monster also. These cases, he thought, might be profitably studied by the light of comparative physiology. Just as in the lower vertebrata—as in fishes—where the small and single ventricle seemed manifestly insufficient to accomplish unaided the circulation through the capillaries of gills and system; just as in some of the lowest of the invertebrata, where, as in plants, the movement is maintained without a heart of any kind: so in these monstrous forms among the highest we must more clearly recognize, in the absence of a heart, the existence of independent forces to circulate the blood.

Dr. Heale called attention to the fact that there must be some force acting on the circulation in the capillaries distinct from that of the heart's pulsation, in order to remedy after each pulsation the distension of the bloodvessels, which would otherwise remain in a state of maximum distension, and be unable to yield any longer to the ensuing pulsation. This force, which empties the capillaries, must be quite as real and important as that which distended them. The changes which occurred during these intervals were precisely those for which the pulsation was calculated to furnish the materials, and they embraced all the strictly vital operations which occurred both in the pulmonary capillaries and in the system at large, and the two balanced each other with the greatest exactness. For, supposing it possible (which it is not) that one or the other should preponderate, the blood would immediately become either too arterial or too venous, as the case might be—a state of things which would necessarily be corrected in the very next pulsation. The heart's action therefore became auxiliary to the action of the capillaries. The placenta of the fœtus accomplished for it precisely what the lungs did for the adult. The difficulty of explaining how the circulation might have been carried on in the acardiac fœtus was materially lessened by these considerations.

Dr. Dickinson, in reply to the remarks of Mr. Savory, allowed the possible existence of a force which promoted the circulation of the blood independently of the action of the heart. In vegetables the circulation was carried on by this alone; but the higher in the animal scale, the more active the circulation and the more necessary the heart. It could not be supposed that in the human fœtus the circulation could be maintained without this organ. It was almost proved that the circulation depended on the heart of the other twin by the fact that in every case of acardiac monstrosity not only was the monster a twin, but it was attached to the same placenta as served for the other child. If the circulation depended on forces within its own body, there could be no reason why it should not be carried on without this connection.—*Lancet*, May 23, 1863.

MATERIA MEDICA AND PHARMACY.

4. *Effect of Tobacco Smoking upon Pulsation.*—DR. EDW. SMITH relates (*Lancet*, March 14, 1863) some experiments to determine the effect of tobacco smoking upon the rapidity of the pulse. These experiments are limited, but Dr. S. thinks that they suffice "to show that tobacco acts variously upon different persons, and that there are those in whom it increases the action of the heart in an important degree. This difference must be sought for in the mode of smoking, the quantity of tobacco consumed in a given time, the reputed strength of the tobacco, and the habits and temperament of the smoker; and upon these questions I would offer an observation or two, with a view to further inquiry.

"1. *The mode of smoking.*—I do not smoke, but I have very carefully tested the mode of smoking, and agree with those who affirm that in ordinary circumstances the tobacco smoke is not mixed with the air in inspiration and carried into the lungs. The position of the throat is that which occurs in ordinary breathing through the nose—viz., the soft palate falls down, and the tongue is raised, so as to cut off the communication between the mouth and the throat. The two acts do not necessarily take place simultaneously. Whenever, as by an accident, a little tobacco smoke is inhaled, the smoker is at once conscious of irritation or choking in the throat, probably followed by cough. If any one have doubt upon this matter, let him endeavour to smoke with the nostrils closed and he will find the act impossible; but it may yet be possible that in cases in which affections of the throat are found in smokers the act may be performed carelessly, or from some cause the tobacco-smoke may frequently touch the pharynx. If the tobacco-smoke be not thus taken into the system, in what manner are the effects upon the pulse induced? It must be chiefly through solution in the saliva, which is then partly absorbed by the absorbent vessels, and partly swallowed, and thus introduced into the system. Whether frequent spitting would prevent or lessen the action needs to be further tested, but within limits it is probable that it would lesson it.

"2. *The quantity of tobacco consumed in a given time.*—In pursuing the inquiry it will be important to aim at uniformity in this respect, and direct that the act be nearly constantly performed so that the smoke may not escape from the open bowl, and that an ordinary bowlful be consumed in 20 minutes. Although it did not appear from Mr. D——'s experiments that rapidity of smoking varied the result, we must remember that the effect of the tobacco upon the pulse had then already been attained, and he is conscious that rapid smoking would make him ill, whilst smoking at the ordinary rate would be agreeable.